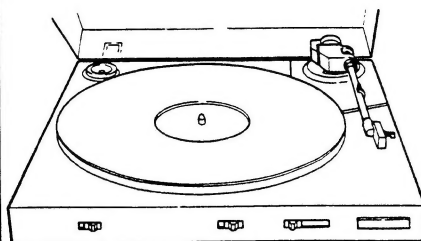


# Service Manual

**PIONEER**  
The future of sound and vision.



ORDER NO.  
ARP1478

STEREO TURNTABLE

## PL-Z93

## PL-Z560

## PL-Z460

STEREO TURNTABLE

## PL-Z91 ZEBM

## PL-Z81 ZEBM

- This service manual is applicable to the PL-Z91/ZEBM and PL-Z81/ZEBM types.

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## 9. PRECAUTIONS FOR REASSEMBLY

If new parts have been used, follow these directions and precautions when reassembling a unit after completing repairs. Also lubricate places requiring lubrication. Incorrect mounting of parts or neglecting lubrication may cause problems with the mechanical section. Follow the procedures properly.

### 9.1 PLACES THAT REQUIRE LUBRICATION

#### NOTE:

Types of lubricants and places where they are used are listed in table 1.

Type of Oil	Places used
Silicon Oil #500000	EV cam section
GYA-008	all other places requiring lubrication

Lubrication points are specified for greases other than GYA-008. Never use a different type of greases.

#### • EV Cam Section

Apply grease to the heart-shaped grooved section (rear side of the cam) and lock plate sliding section in order to minimize wear on the sliding section and the burden on the mechanism.

#### • Driving Plate Assembly

Decrease the burden on the mechanism and the wear on the sliding section.

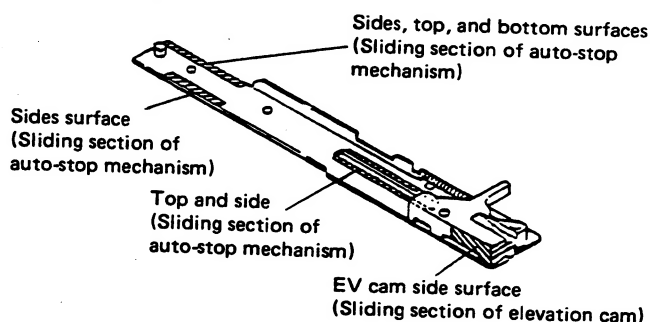


Fig. 9-1 Driving plate assembly section

#### • Switch Locker Section

Apply grease to the switch locker (hole) and sub-panel base sliding section to decrease the burden on the mechanism.

When applying grease to the hole (shaft hole), do not apply any grease 2-3mm from the button surface. If grease is applied 2-3mm within the bottom surface, it may come out the bottom and go between the switch lever and sub-panel base causing the switch lever to operate ineffectively.

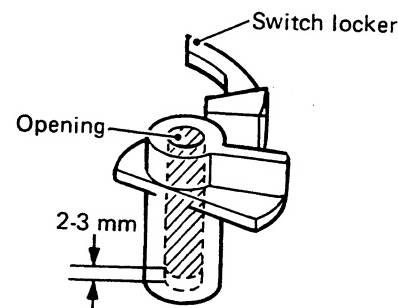


Fig. 9-2 Switch locker section

#### • EV Sheet Section

Apply grease to the elevation shaft and sliding section of the bearing.

This is to assure stability in the elevation lowering speed.

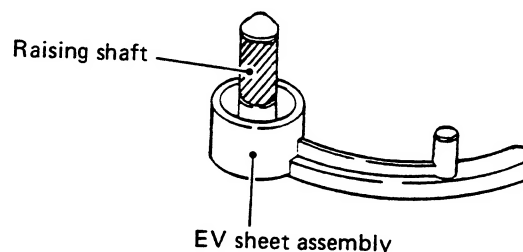


Fig. 9-3 EV sheet section

#### • Elevation Cam Section

Apply GYA-008 grease to the elevation cam and sliding section of the raising shaft to decrease the burden when operated.

Also apply silicon oil #500000 to the hole. This is to stabilize the elevation lowering speed.

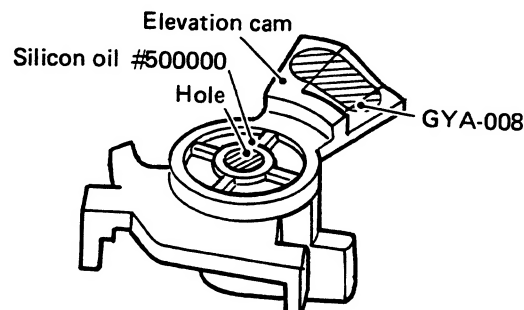


Fig. 9-4 Elevation cam section

- Index Cam Section (PL-Z91 only)

Apply grease to the index cam lower surface of the hooked section to decrease the burden on the mechanism.

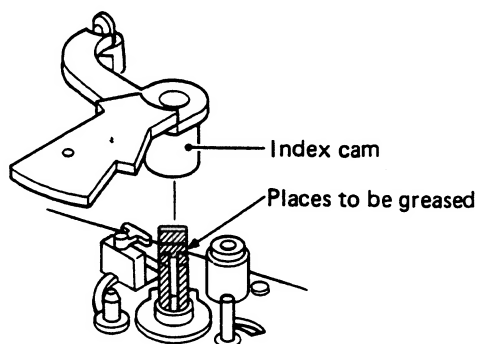


Fig. 9-5 Index cam section

- Reset Plate Section (PL-Z91 only)

Apply grease to the sub-panel base (shaft) and sliding section of the reset plate to decrease the burden on the mechanism.

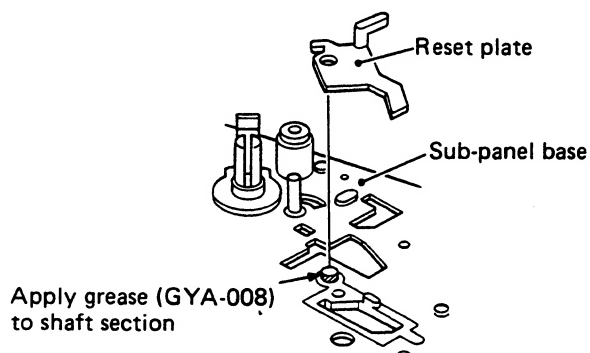


Fig. 9-6 Reset plate section

- Other Places to be Greased (PL-Z91 only)

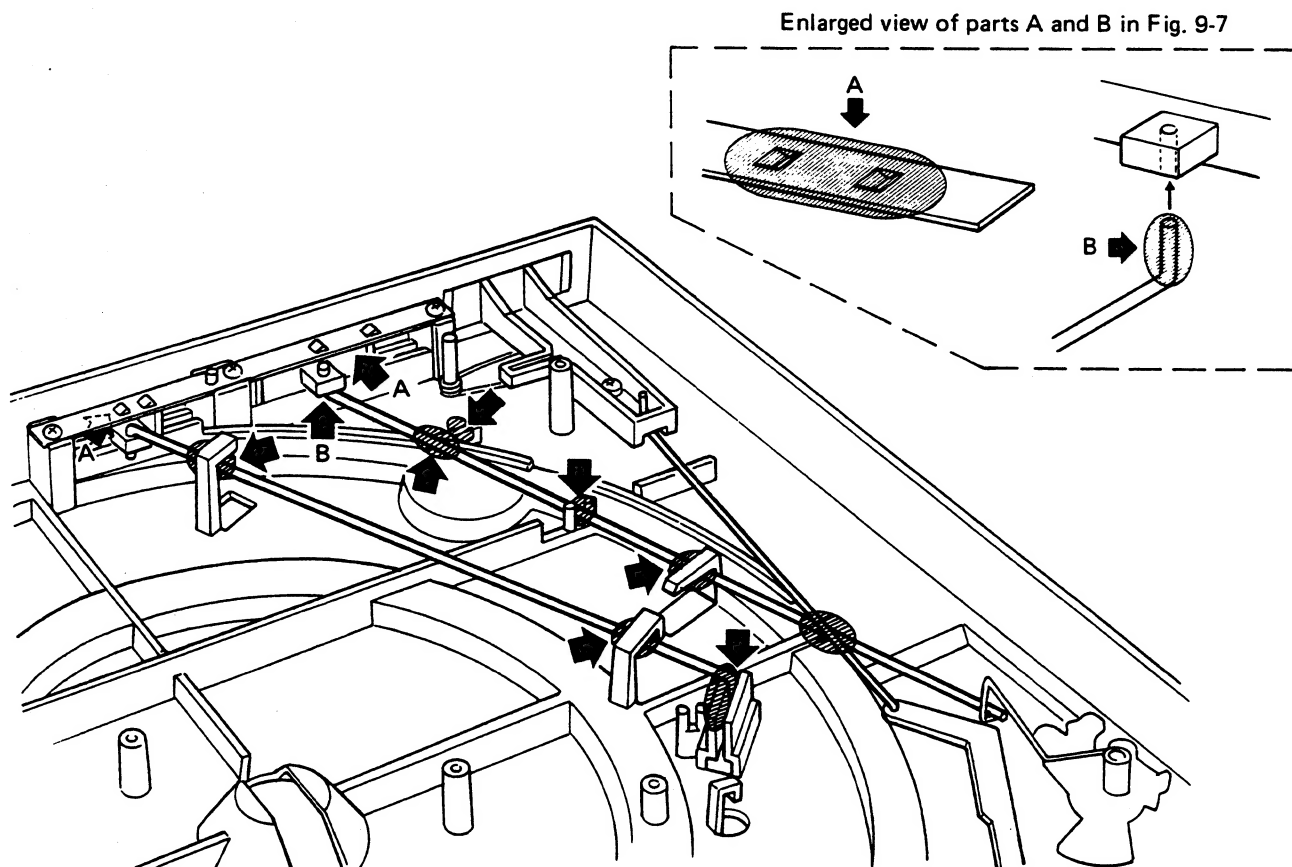


Fig. 9-7

- Other Places to be Greased (PL-Z81 only)

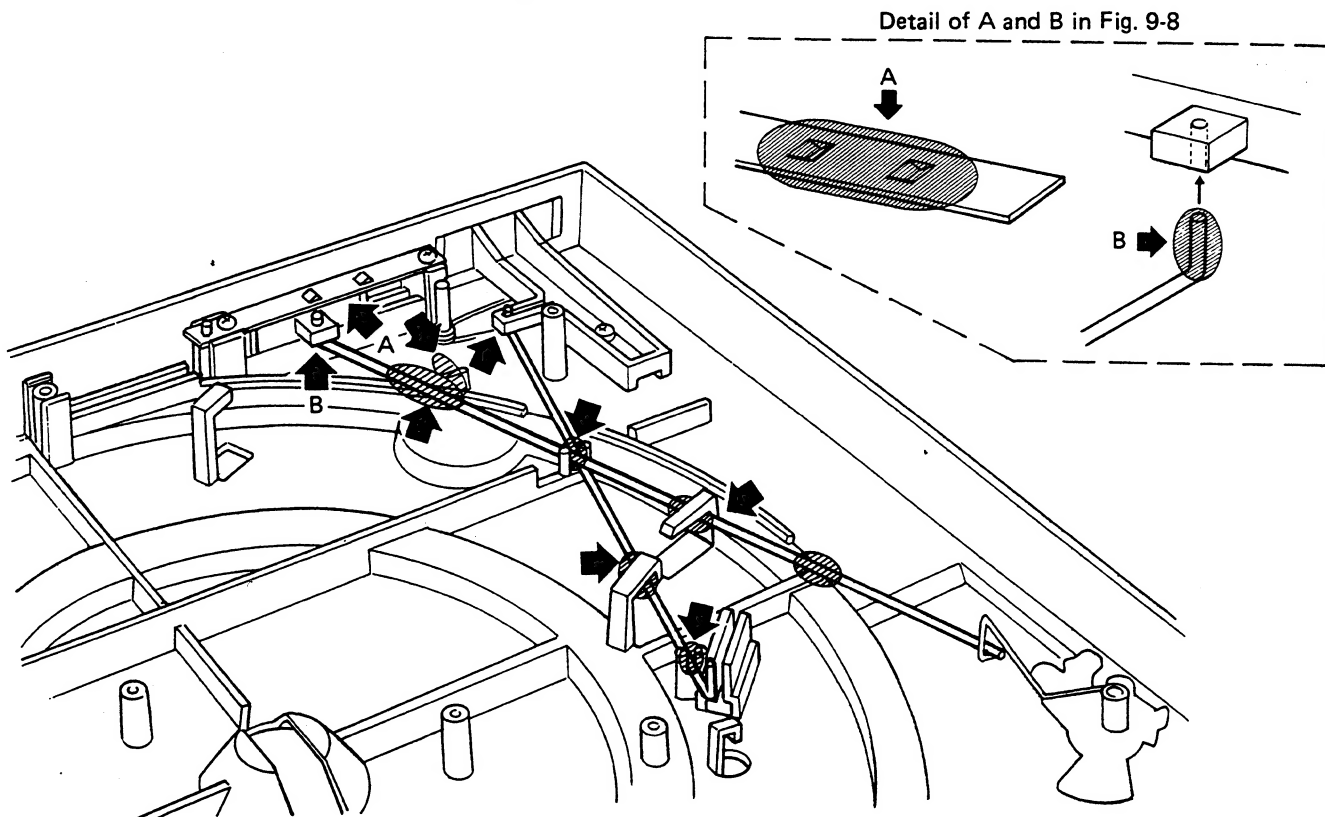


Fig. 9-8

## 9.2 PRECAUTIONS FOR ATTACHMENT OF PARTS AND REASSEMBLY

### • Cam Assembly Attachment

The cam assembly is attached by letting the lock spring go in the direction ① as shown in Fig. 9-9.

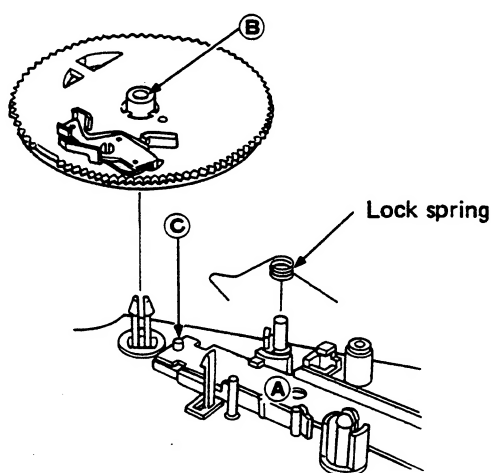


Fig. 9-9 Cam assembly attachment

### • PU Plate Assembly Attachment

The PU plate assembly is attached with screw ② by pushing the PU plate bearing section against the arm rotating shaft fixing nut.

The attachment direction is matched to the center of the support line as shown in Fig. 9-10. (position the tonearm above the arm rest).

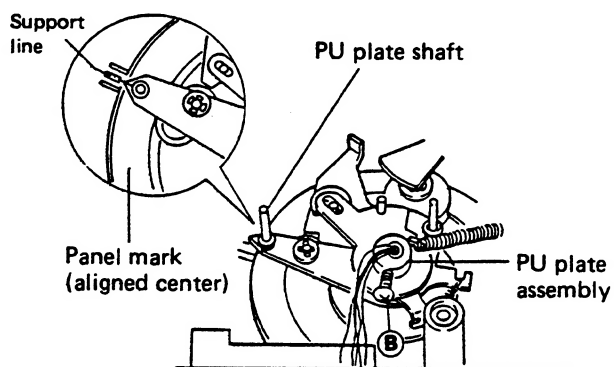


Fig. 9-10 PU plate attachment

### • Arm Base Attachment

When mounting the subpanel assembly to the unit (panel), set the position of the switch locker in the subpanel assembly and the switch lever so that the microswitch (S1: for power on/off) is in the OFF position. Also set the tonearm above the arm rest. Set the arm elevator to UP. Then when the subpanel is mounted, mount the PU plate shaft in the position shown in Fig. 9-11.

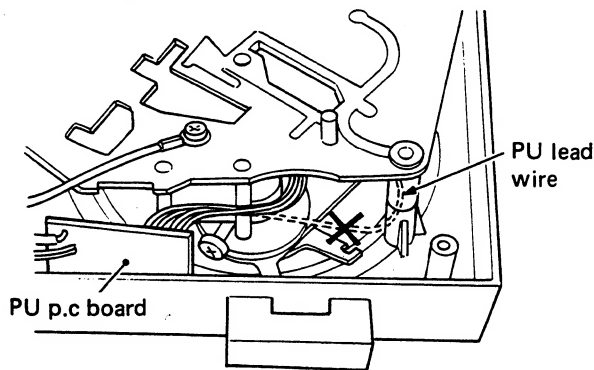


Fig. 9-11 Arm base attachment

### 3. MICROSWITCH LEAD WIRE STYLING CONFIRMATION (PL-Z91 only)

When attaching the mechanism assembly to the panel, be careful that the lead wires do not contact the select lever as shown in Fig. 9-12. If the lead wires contact the select lever, record size detection will malfunction.

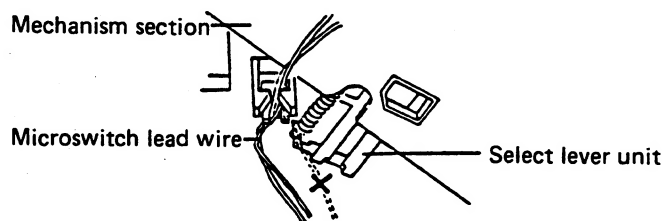


Fig. 9-12 Microswitch lead wire attachment

### • Start Lever Unit Attachment (PL-Z91 only)

Attach the shaft section of the start lever unit as shown in Fig. 9-13 so that it comes between the reset plate and start plate.

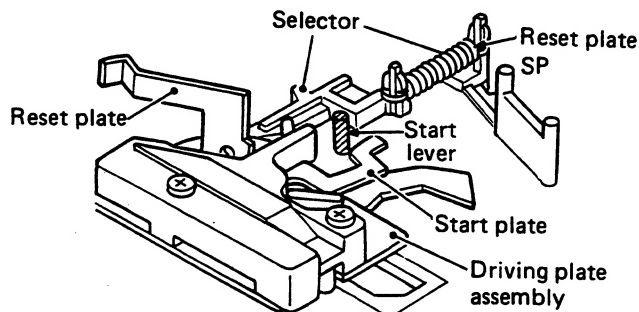


Fig. 9-13 Start lever unit attachment

### • Spindle Assembly Attachment (PL-Z91 only)

When installing the spindle assembly, set the cam in the mechanism stop location and verify that the starting plate section (B) does not protrude beyond surface (A) of the cam. If the spindle assembly is attached with the starting plate section (B) protruding, the starting plate may be deformed, the spindle assembly pinion gear may be scratched, and the return function may be come disabled.

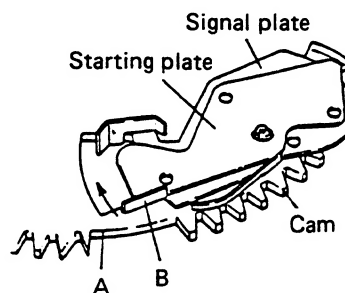


Fig. 9-14 Spindle assembly attachment

### • Installing the Cords (PL-Z91 only)

For the styling of the PU cord assembly and other lead wiring, refer to Fig. 9-15.

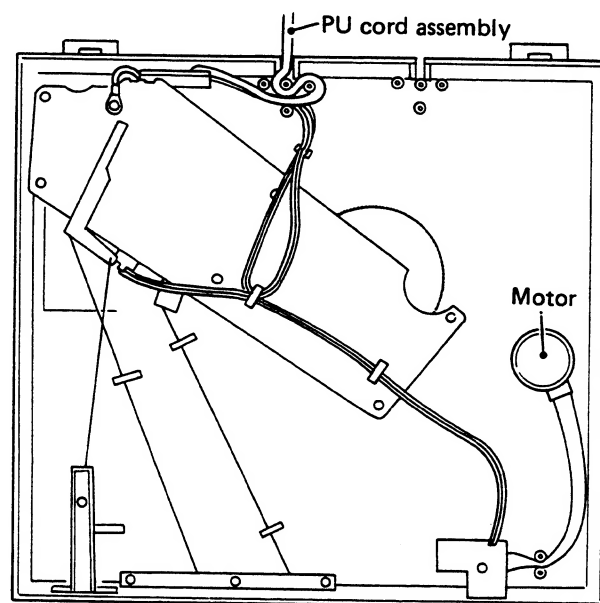


Fig. 9-15 Cords stringing

## 10. ADJUSTMENTS

### 10.1 MOTOR ADJUSTMENTS

Place the record player on blocks as shown in Fig. 10-1 and adjust the motor from the under base.

1. Turn the arm elevation lever up to raise the arm.
2. Place a strobo sheet on the turntable, move the arm to the turntable side, and rotate the turntable.
3. Adjust semifixed resistors VR1 and VR2 of the motor assembly so the 33-1/3 rpm and 45 rpm strobo of the strobo sheet appears to the static.
4. First adjust VR1 for 45 rpm and then the adjust VR2 for 33-1/3 rpm.

### 10.2 STYLUS LANDING POSITION ADJUSTMENT (PL-Z91 only)

When the tonearm doesn't land in the correct position during automatic playback, adjust according to the following procedure.

1. Place a 30cm record on the platter.
2. Press the START/STOP switch and start automatic playback. Note the landing position of the stylus. (How many mm to the inside or outside compared to the proper landing position on the platter.)
3. Depress the START/STOP switch to return the tonearm to the tonearm rest.
4. Press the arm elevation switch to raise the stylus.
5. With the adjustment hole visible, move the tonearm to the edge of the record by hand.
6. Turn the adjustment screw with a small screwdriver according to step 2 as follows:
  - When the stylus lands at the outside of the record, turn the adjustment screw clockwise.
  - When the stylus lands on the proper position toward the record center, turn the adjustment screw counterclockwise. One half turn of the adjustment screws moves the tonearm about 12mm.
7. After adjustment, press the START/STOP switch and check if the stylus landing point was correctly adjusted.  
If adjustment is incorrect, repeat steps 3 to 6.

Be careful not to damage the record and stylus when making this adjustment.

### ADJUSTMENT USING A TEST RECORD

(Landing position adjustment cannot be done when the tonearm is on the record.)

30cm landing point . . . . . Lands between count 306 and 313.

17cm landing point . . . . . Lands between count 175 and 183.

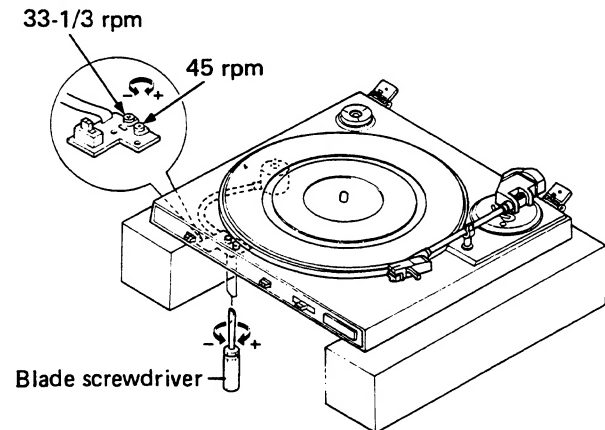


Fig. 10-1 Motor adjustment

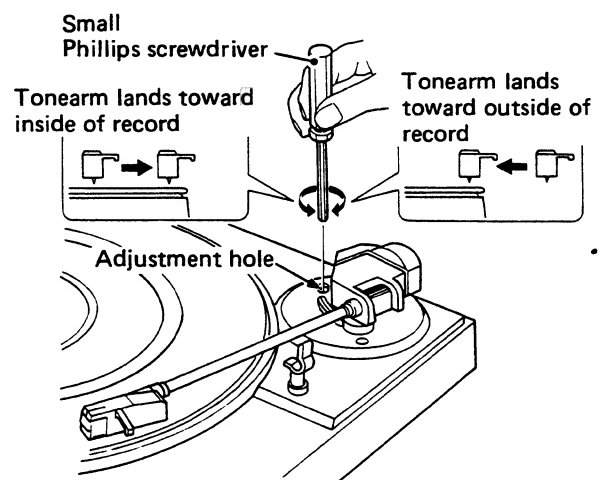


Fig. 10-2 Stylus landing point adjustment

### 10.3 AUTO-RETURN POSITION ADJUSTMENT

When the auto-return position is too near or too far, make the following adjustments.

1. Check the stylus landing position. If the stylus does not land at the correct position, adjust the landing position.
2. Set the arm elevation switch to UP and turn the auto-return adjustment screw fully counter-clockwise.
3. Move the tonearm as far as it will go toward the center.
4. When the auto-return adjustment screws is turned slowly clockwise, the tonearm will begin to move toward the center.
5. Stop turning the adjustment screw at the point at which there is a space of 32mm between the stylus of the cartridge and the center shaft. (Fig. 10-3)
6. After adjustment, check that auto-return is performed correctly and that the stylus landing position is correct.

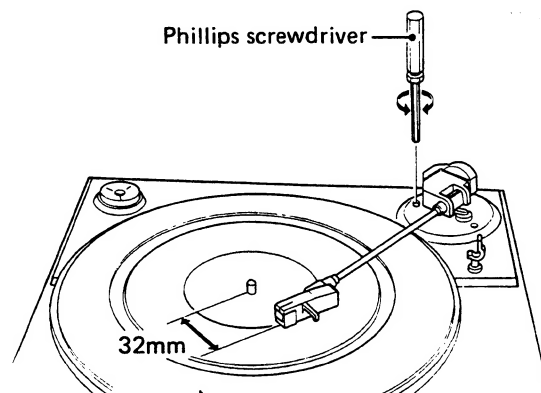


Fig. 10-3 Auto-return position adjustment

### 10.4 ARM ELEVATION HEIGHT ADJUSTMENT

1. Press the arm elevation switch to move the arm up.
2. Turn the height adjustment screw on the side of the arm elevation unit with a Phillips screwdriver so that the distance between the record and the stylus is  $7 \pm 2$ mm. The arm moves up when the screw is turned counterclockwise.

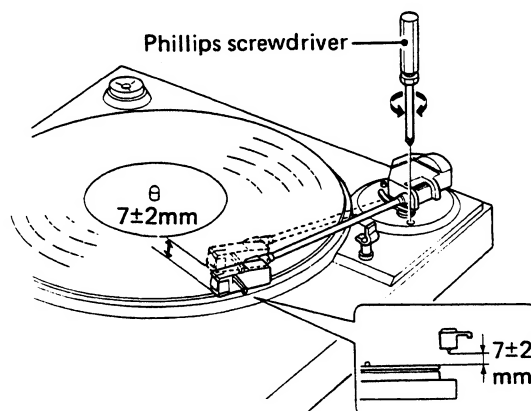
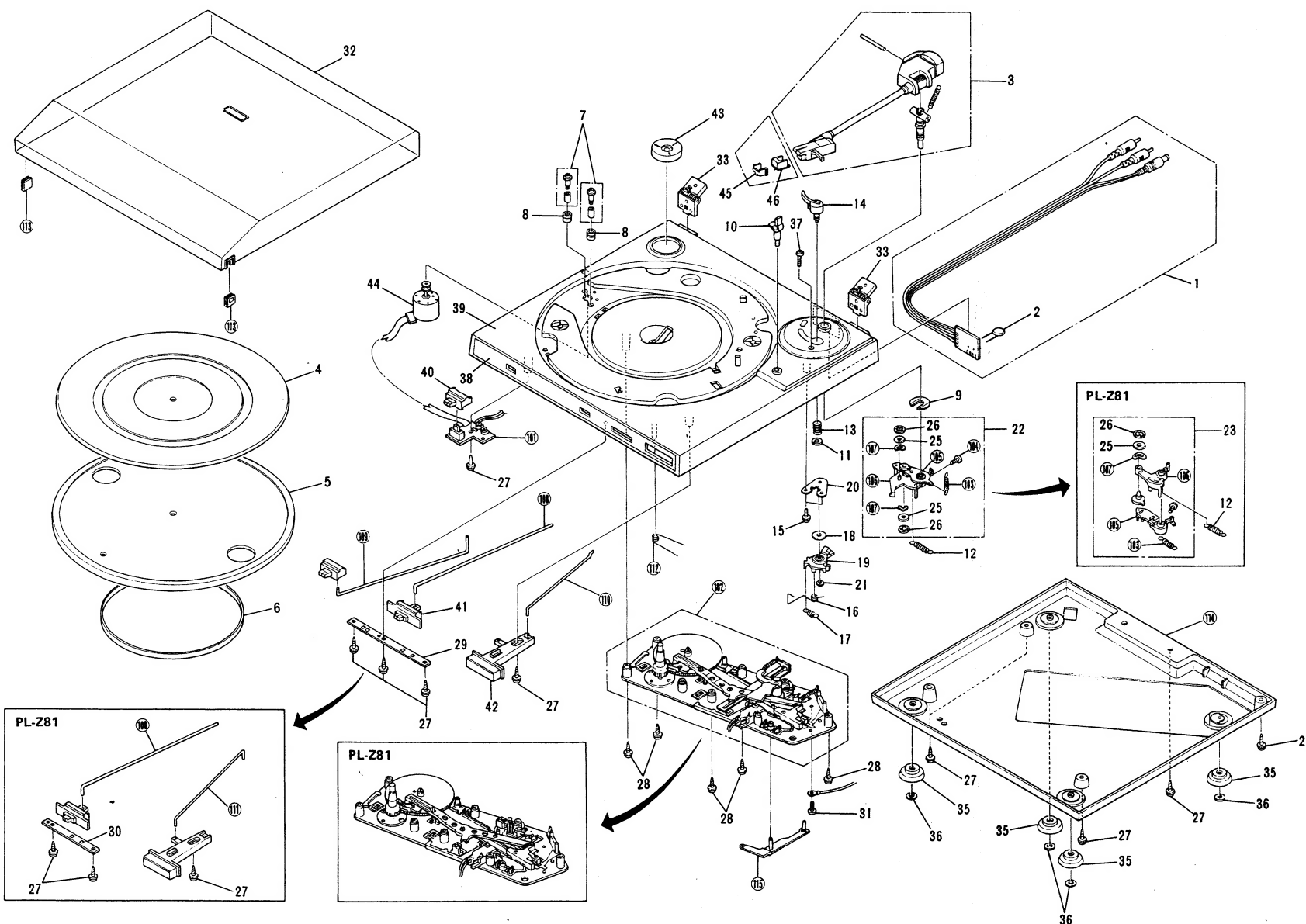


Fig. 10-4 Arm elevation adjustment

EXTERIOR







**PIONEER®**  
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# Service Manual

ORDER NO.  
**ARP1892**

STEREO TURNTABLE

# PL-Z93

## PL-Z560

## PL-Z460

PL-Z93, PL-Z560 AND PL-Z460 HAVE FOLLOWING VERSIONS:

Type	Applicable model			Power requirement	Destination
	PL-Z93	PL-Z560	PL-Z460		
ZUC	○			(DC power supply)	U.S.A. and Canada
ZEBM	○	○	○	(DC power supply)	Australia European continent and United Kingdom

● Refer to the service manual ARP1478, PL-Z91/ZEBM type.

- This manual is applicable to the PL-Z93/ZEBM, ZUC, PL-Z560/ZEBM and PL-Z460/ZEBM types.
- As to the system composition and operating instructions refer to following service manual.

Applicable model	System composition	Service manual	Applicable model	System composition	Service manual
PL-Z560, PL-Z460	S-777D/S-555D	ARP1930	PL-Z93	S-111	ARP1937
PL-Z560, PL-Z460	S-999D	APR1929	PL-Z93	S-115CDT	ARP1938
PL-Z93	S-333	ARP1935	PL-Z93	S-115CDM	ARP1939
PL-Z93	S-222	ARP1936			

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**NOTES:**

- Parts without part number cannot be supplied.
- The  $\triangle$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

The PL-Z93/ZEBM, ZUC, PL-Z560/ZEBM and PL-Z460/ZEBM types are the same as the PL-Z91/ZEBM type with the exception of the following sections.

Mark	Symbol & Description	Part No.				
		PL-Z91/ZEBM	PL-Z93/ZEBM	PL-Z93/ZUC	PL-Z560/ZEBM	PL-Z460/ZEBM
	Sub-panel assembly	Non supply	Non supply	Non supply	Non supply	Non supply
	Name plate	.....	.....	.....	AAM1002	AAM1002
	Speed button	PAC1226	PAC1226	PAC1436	PAC1226	PAC1226
	EV button	PAC1227	PAC1227	PAC1437	PAC1227	.....
	S/S button	PAC1228	.....	.....	PAC1468	.....
	Cut button	.....	PAC1467	PAC1469	.....	PAC1467
	Front name plate	PAM1156	PAM1392	PAM1395	PAM1394	PAM1393
	Front name plate assembly	.....	.....	.....	PEA1033	PEA1032
	Insulator	PEB1061	PEB1061	PEB1061	PEB1105	PEB1105
	Insulator assembly	.....	.....	.....	PXA1196	PLX1196
	Cut rod	.....	Non supply	Non supply	.....	Non supply
	Size rod	Non supply	.....	.....	Non supply	.....
	S/S rod	Non supply	.....	.....	Non supply	.....
	Protector (R)	PHA1045	PHA1045	PHA1045	PHA1082	PHA1082
	Protector (L)	PHA1046	PHA1046	PHA1046	PHA1083	PHA1083
	Button stopper F	PBK1038	.....	.....	PBK1038	.....
	Button stopper R	.....	PBK1037	PBK1037	.....	.....
	Packing case	PHG1163	PHG1450	PHG1474	PHG1452	PHG1451
	Panel	PNW1294	PNW1292	PNW1734	PNW1294	PNW1292
	Start lever	Non supply	.....	.....	Non supply	.....
	PU plate assembly	PXA1109	.....	.....	PXA1109	.....
	PU plate (B) assembly	.....	PXA1114	PXA1114	.....	PXA1114

The Sub-panel assembly (PL-Z93/ZEBM, ZUC types). Sub-panel assembly (PL-Z560/ZEBM type) and Sub-panel assembly (PL-Z460/ZEBM type) are the same as the Sub-panel assembly (PL-Z91/ZEBM type) with the exception the following sections.

Mark	Symbol & Description	Part No.				
		PL-Z91/ZEBM	PL-Z93/ZEBM	PL-Z93/ZUC	PL-Z560/ZEBM	PL-Z460/ZEBM
	Select lever	PBH1053	.....	.....	PBH1053	.....
	Reset plate spring	PBH1054	.....	.....	PBH1054	.....
	Select lever	PNB1096	.....	.....	PNB1096	.....
	Index cam	PNW1296	.....	.....	PNW1296	.....
	Reset plate	PNW1312	.....	.....	PNW1312	.....
	Selector	PNW1313	.....	.....	PNW1313	.....
	Drive plate assembly	PXA1110	PXA1112	PXA1112	PXA1110	PXA1112

# 1. SPECIFICATION

## Turntable: PL-Z91/PL-Z81

### Motor, Platter

Motor Type	DC servo motor
Drive Method	belt drive
Speed	33-1/3, 45 RPM
Speed Variation	0.07% WRMS (JIS $\pm 0.10\%$ WTD)
	Peak (DIN)
S/N Ratio	68 dB (DIN-B)
Platter	295mm dia., aluminum die-cast

### Tonearm

Type	Dynamic-balance type, straight tonearm
------	--

### Installed Cartridge

Type	MM type
Replacement Stylus	PN-210
Stylus	0.6 mil diamond
Output voltage	2.5mV (1kHz, 3.54cm/s, Lat. peak)
Tracking Force	2-3.0g (optimum 2.5g)
Frequency Response	20Hz to 20,000Hz
Load Resistance	47k $\Omega$
Cartridge Weight	4g

### Other

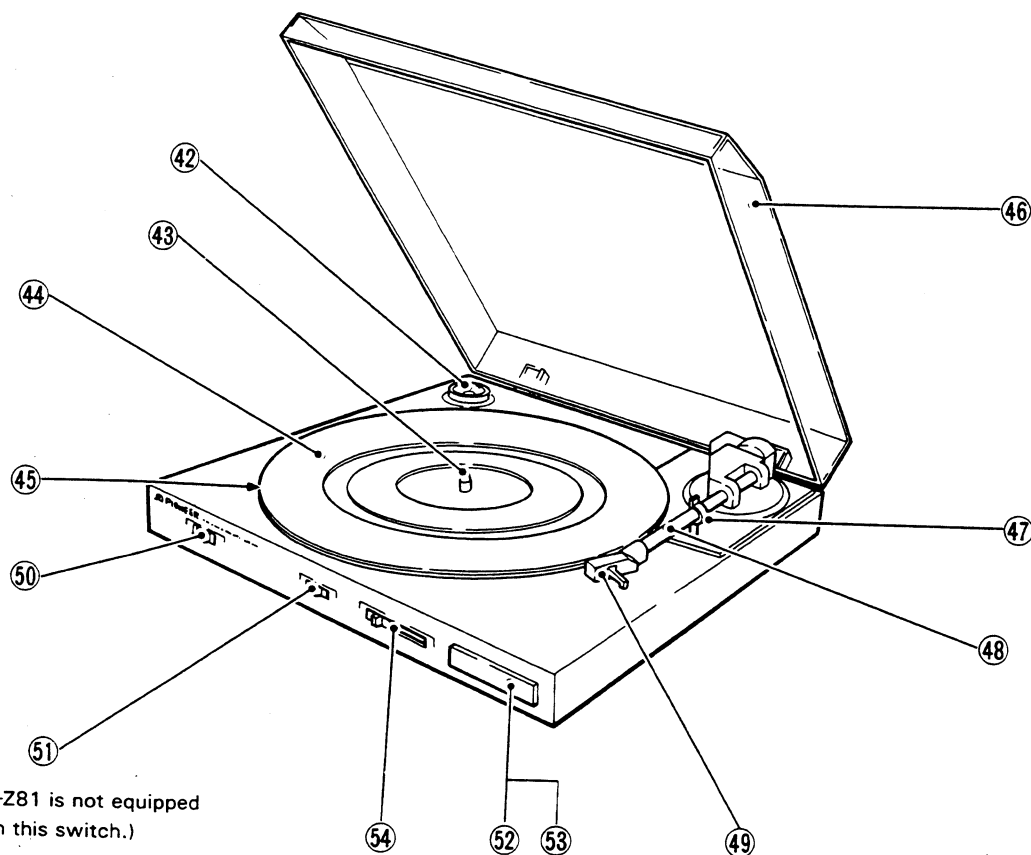
Dimensions	360W $\times$ 90H $\times$ 350.5D(mm)
Weight	
PL-Z91	2.7kg
PL-Z81	2.7kg

### Accessories

EP Adaptor	1
------------	---

*Specifications and design subject to possible modifications without notice due to improvement.*

# 2. PANEL FACILITIES



- ④② EP adaptor
- ④③ Platter shaft
- ④④ Platter mat
- ④⑤ Platter
- ④⑥ Dust cover
- ④⑦ Arm rest
- ④⑧ Tonearm
- ④⑨ Cartridge

#### ⑤① SPEED switch

Set this switch in accordance with the speed of the record.  
33: For 33-1/3 rpm records. 45: For 45 rpm records.

#### ⑤① DISC SIZE switch (only PL-Z91)

Set this switch in accordance with the size of the record.  
30: For 30 cm LP records. 17: For 17 cm EP records.

#### ⑤② PLAY/STOP switch (only PL-Z91)

Press this switch when starting auto play or when stopping play.

#### NOTE:

*Be sure to press the switch firmly when starting playback; if not pressed firmly, the platter may rotate without the tonearm moving.*

#### ⑤③ CUT switch (only PL-Z81)

Press this switch when stopping play.

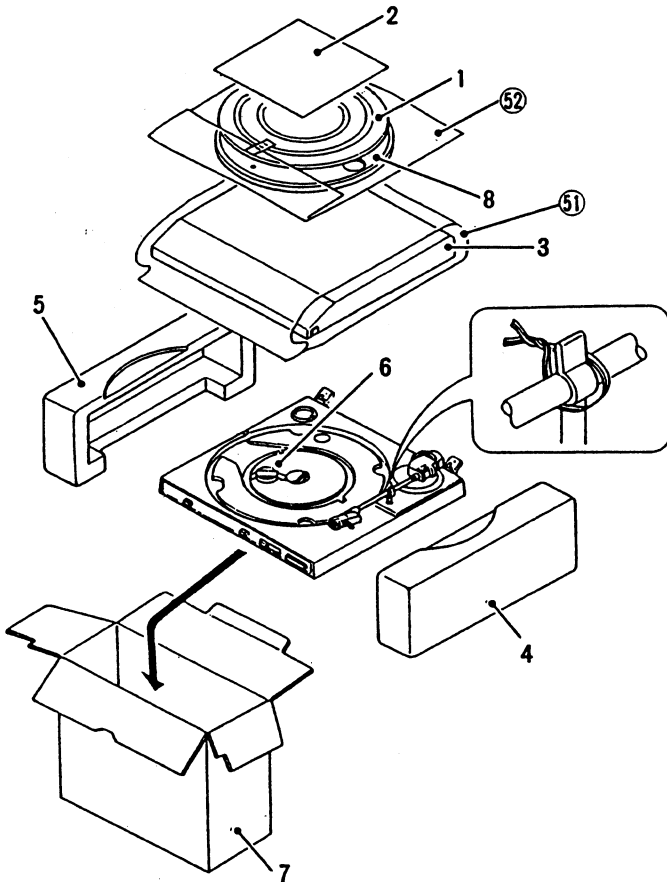
#### ⑤④ ARM ELEVATION switch

- Use the switch for manual play.
- Use the switch to suspend record play temporarily.
- Use the switch when changing the tracks during actual play.

[UP]: The tonearm rises (the stylus moves away from the record).

[DOWN]: The tonearm descends (the stylus is lowered onto the record).

## 3. PACKING



#### Parts List of Packing (PL-Z91 and PL-Z81)

Mark	No.	Part No.	Description
	1.	PEB1059	Turntable sheet
	2.	PRH1007	Operating instructions
	3.	PNV1008	Dust cover
	4.	PHA1045	Protector (R)
	5.	PHA1046	Protector (L)
	6.	PEC1002	45 adaptor
	7.	PHG1163	Packing case (For PL-Z91)
		PHG1158	Packing case (For PL-Z81)
	8.	PNR1020	Turntable
	51.		Mirror mat
	52.		Vinyl bag

- Mechanism Assembly (Sub-panel Assembly) and Motor

1. Rotate the turntable platter to disengage the mechanism.
2. Fix the tonearm to the arm rest. (Be sure to cover the stylus with the stylus cover.)
3. Remove the turntable sheet assembly and then the turntable platter.
4. Close the dust cover, turn the turntable upside down, and place it on a soft surface, e.g., a work bench covered with soft cloth (for product protection).
5. Remove the five screws labeled ①, and remove the under base.
6. Remove the five screws labeled ② and one screw labeled ③, and remove the lead connected to the microswitch. This operation will release the mechanism assembly.
7. Remove the two screws labeled ④ to remove the motor assembly.

- Tonearm assembly

1. Remove the mechanism assembly from the panel.
2. Unsolder and disconnect the PU leads (arm leads) from the PU printed circuit board.
3. Remove the AS spring from the PU plate assembly.
4. Remove the screw labeled ⑤, and remove the PU plate assembly from the tonearm assembly.
5. Remove the R clip.
6. Place the turntable on one of its sides, remove the arm clamp, and gently pull out the tonearm assembly from the panel.

## 5. EXPLODED VIEW

### 5.1 EXTERIOR

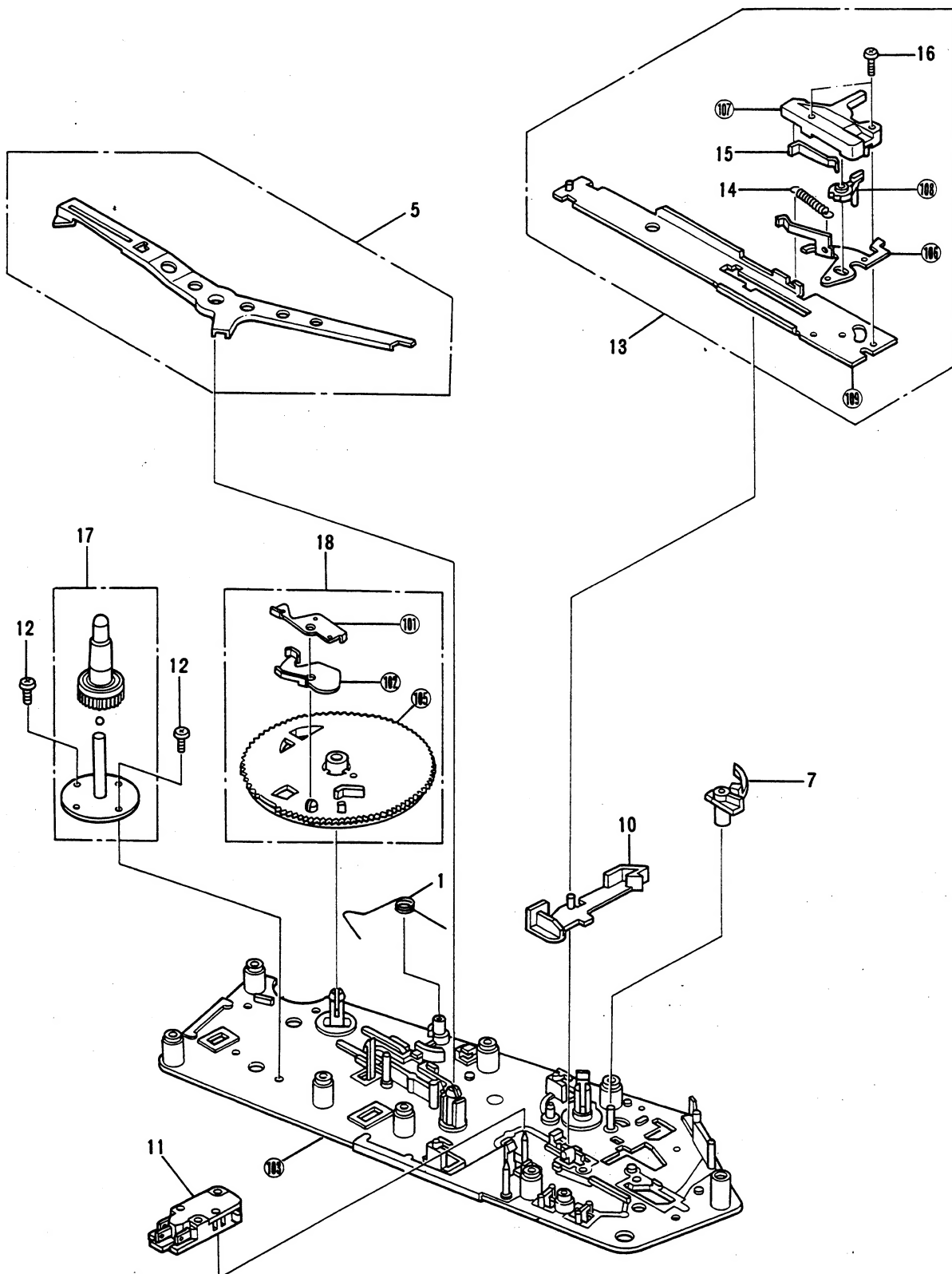
#### NOTES:

- Parts without part number cannot be supplied.
- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your Parts Stock Control, the fast moving items are indicated with the marks  $\star\star$  and  $\star$ .  
 $\star\star$  GENERALLY MOVES FASTER THAN  $\star$   
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

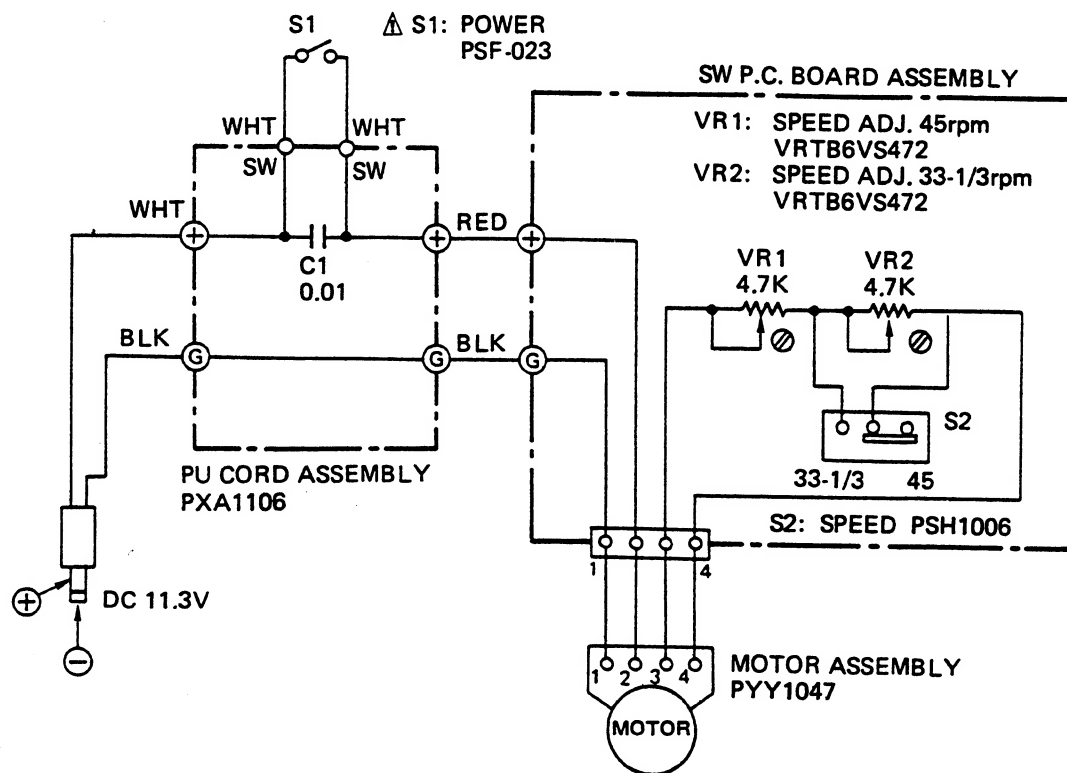
#### Parts List of Exterior

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	PXA1106	PU cord assembly		37.	BPZ26P120FZK	Screw
	2.	CKDYF103Z50	Ceramic capacitor		38.	PAM1156	Front name plate (For PL-Z91)
$\star$	3.	PPD1016	Arm assembly			PAM1155	Front name plate (For PL-Z81)
	4.	PEB1059	Turntable sheet		39.	PNW1294	Panel (For PL-Z91)
$\star\star$	5.	PEB1060	Belt			PNW1292	Panel (For PL-Z81)
	6.	PNR1020	Turntable		40.	PAC1226	Speed button
	7.	PBA-112	Screw		41.	PAC1227	EV button
	8.	PEB1063	Rubber		42.	PAC1228	S/S button
	9.	PBK1033	R clip		43.	PEC1002	45 adaptor
$\star$	10.	PNW1289	Arm rest		44.	PYY1047	Motor assembly
	11.	PBF-020	Washer		45.	PNW1319	Stylus cover
	12.	PBH1044	AS spring		46.	PXV1004	Cartridge
	13.	PBH1046	EV spring		101.		SW P.C. board assembly
	14.	PNW1290	EV sheet		102.		Sub-panel assembly
	15.	IPC30P100FMC	Screw		103.		PU plate spring
	16.	PBH1050	EV lever spring		104.		Screw (PL-Z91 only)
	17.	PBH1051	Elevation cam spring		105.		PU plate (A)
	18.	PED-051	Washer		106.		PU plate (B)
	19.	PNW1309	Elevation cam		107.		PU spring washer
	20.	PXT1017	EV plate spring (D) unit		108.		EV rod
	21.	WT31D054D050	Washer		109.		Size rod (PL-Z91 only)
	22.	PXA1109	PU plate assembly (PL-Z91 only)		110.		S/S rod (PL-Z91 only)
	23.	PXA1114	PU plate (B) assembly (PL-Z81 only)		111.		Cut rod (PL-Z81 only)
	24.	PMD40P080FMC	Screw (PL-Z81 only)		112.		S/S spring
	25.	WC40FMC	Washer		113.		Rubber
	26.	YS40FBT	Washer		114.		Under base
	27.	IPC30P100FMC	Screw		115.		Start lever
	28.	IPC30P290FMC	Screw				
	29.	PBK1038	Button stopper F (PL-Z91 only)				
	30.	PBK1037	Button stopper R (PL-Z81 only)				
	31.	PSZ30P060FMC	Screw				
	32.	PNV1008	Dust cover				
	33.	PXA1108	Hinge assembly				
	34.	....	...				
	35.	PEB1061	Insulator				
	36.	YP40FBK	Nut				

# 5.3 SUB-PANEL ASSEMBLY (PL-Z81)



## 6. SCHEMATIC DIAGRAM



### 1. RESISTORS:

Indicated in  $\Omega$ , 1/8W & 1/4W,  $\pm 5\%$  tolerance unless otherwise noted k; k $\Omega$ , M; M $\Omega$ , (F);  $\pm 1\%$ , (G);  $\pm 2\%$ , (K);  $\pm 10\%$ , (M);  $\pm 20\%$  tolerance

### 2. CAPACITORS:

Indicated in capacity ( $\mu$ F)/voltage (V) unless otherwise noted p; pF. Indication without voltage is 50V except electrolytic capacitor.

### 3. VOLTAGE, CURRENT:

$\square$ : DC voltage (V) at no input signal  
Value in ( ) is DC voltage at rated power.  
mA: DC current at no input signal

### 4. OTHERS:

$\Rightarrow$ : Signal route.  
 $\otimes$ : Adjusting point.

The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.  
\* marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

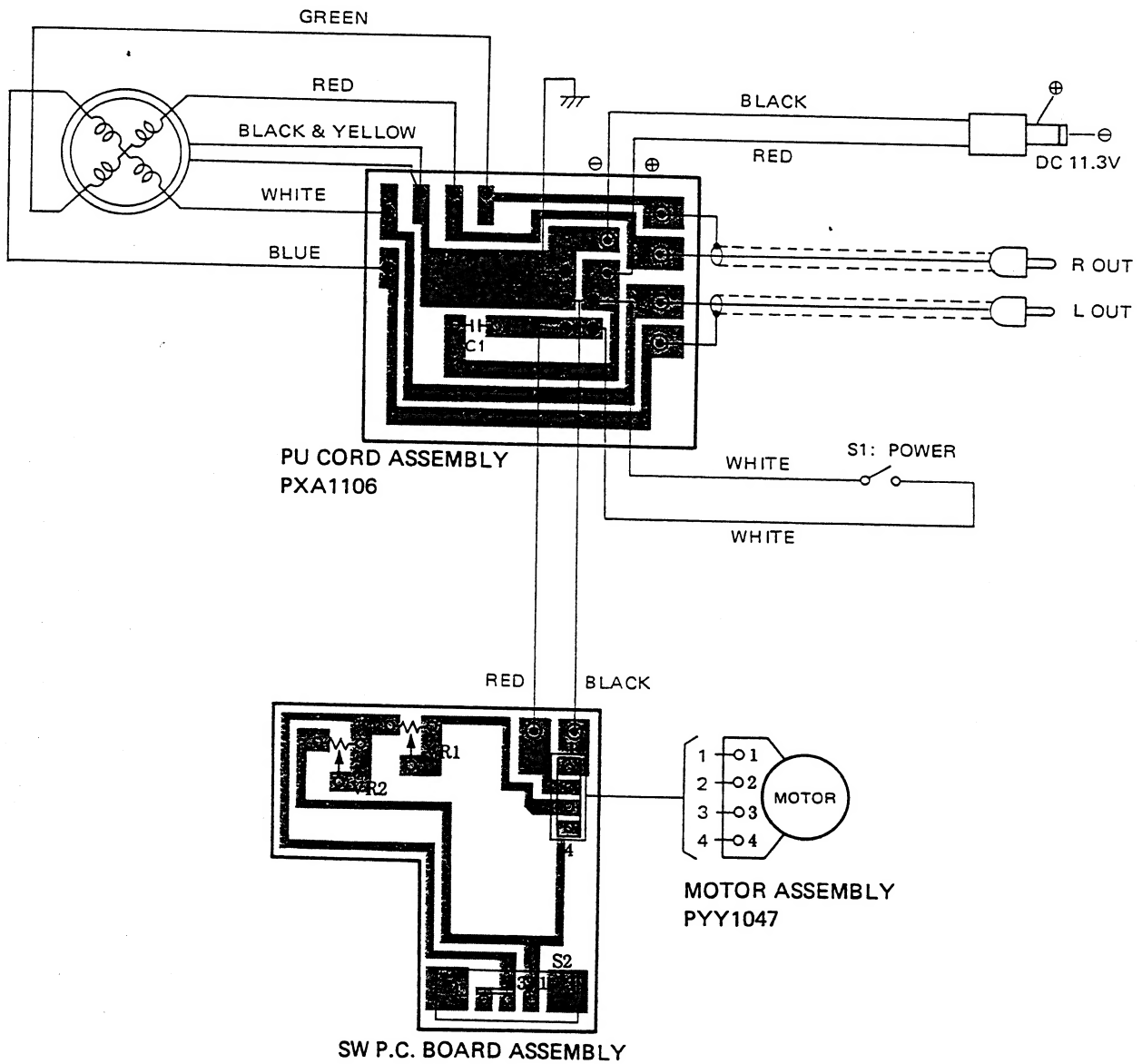
### SWITCHES:

S1: POWER ON - OFF  
S2: SPEED 33-1/3 rpm - 45 rpm

The underlined indicates the switch position.



## 7. P.C. BOARDS CONNECTION DIAGRAM



## 8. ELECTRICAL PARTS LIST

### NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.
- ★★ **GENERALLY MOVES FASTER THAN ★**
- This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	$56 \times 10^1$	561.....	RD1/4PS	5	6	1	J
47kΩ	$47 \times 10^3$	473.....	RD1/4PS	4	7	3	J
0.5Ω	0R5.....		RN2H	0	5		K
1Ω	010.....		RS1P	0	1	0	K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	$562 \times 10^1$	5621.....	RN1/4SR	5	6	2	1	F
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### Miscellaneous Parts

Mark	Symbol & Description	Part No.
	SW P.C. board assembly	
	PU cord assembly	PXA1106
★★	Motor assembly	PYY1047

### SW P.C. Board Assembly

#### SWITCH

Mark	Symbol & Description	Part No.
★★	S2 Slide switch (SPEED)	PSH1006

### PU Cord Assembly (PXA1106)

#### CAPACITOR

Mark	Symbol & Description	Part No.
	C1 Ceramic capacitor	CKDYF103Z50

#### RESISTORS

Mark	Symbol & Description	Part No.
★	VR1, VR2 Semi-Fixed resistor	VRTB6VS472